INDONESIAN TREASURY REVIEW
JURNAL PERBENDAHARAAN, KEUANGAN NEGARA, DAN KEBIJAKAN PUBLIK

THE PATTERN OF ECONOMIC GROWTH IN INDONESIA BETWEEN 1995 AND 2005 IN COMPARISON WITH MALAYSIA AND THAILAND: AN INPUT-OUTPUT ANALYSIS

Niswatil Mouna*
Adam Smith Business School, University of Glasgow, Glasgow, United Kingdom
email address: n.mouna.1@research.gla.ac.uk

*Corresponding author: n.mouna.1@research.gla.ac.uk

ABSTRACT

The pattern of economic growth in Indonesia between 1995 and 2005 was analyzed to determine structural changes that occurred in Indonesia. A hypothetical analysis of Deviation from Proportional Growth was used in this study to better understand the structural change of a country by assuming a virtual economic structure. The author analyzed the Indonesian National Input-Output Table of 1995, 2000, and 2005 extracted from the Asian International Input-Output Table. A comparative study was also conducted for Malaysia and Thailand during the same period. The results revealed a shift away from the agricultural sector towards non-agricultural sectors in Indonesia, Malaysia, and Thailand between 1995 and 2005, confirming the existence of industrialization in these countries. Although the countries had a similar pattern of growth which is contributed mainly by the expansion of export from 1995–2000, the pattern of growth among the three countries was divergent from 2000–2005.

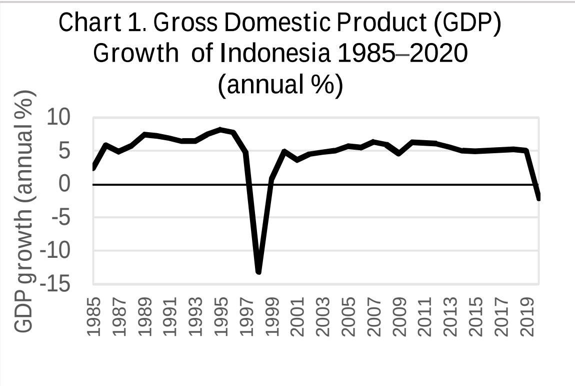
Keywords: Economic Structure, Input-Output Analysis, Pattern of Growth, Source of Growth, Structural Change

JEL classification:
O11, P52

CARA MENGUTIP:
Mouna, N. (2021). The pattern of economic growth in indonesia between 1995 and 2005 in comparison with malaysia and thailand: an input-output analysis. *Indonesian Treasury Review: Jurnal Perbendaharaan, Keuangan Negara, dan Kebijakan Publik*, 6(4), 299-315.

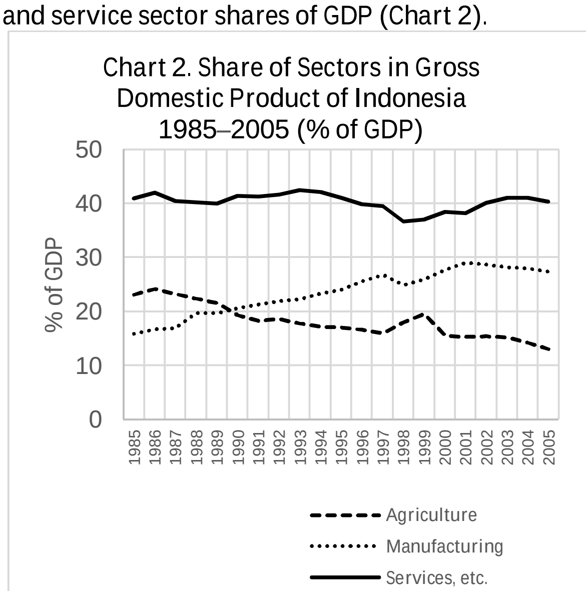
INTRODUCTION

Indonesia experienced sustainable economic growth with an average of seven per cent from 1985 to 1997, with the government's policy focused on creating a balanced economic structure and developing an export-oriented industry, as mentioned in the development plans (Akita & Hermawan, 2000). However, the growth plunged into negative during the financial crisis in 1997. Nevertheless, the country managed to recover afterwards and maintain a relatively stable growth of five per cent before the global pandemic caused another negative growth in 2020 (Chart 1).



Source: WDI (2021)

Also, structural change happened in Indonesia from 1985 to 2005, covering the prior and latest research periods. There was a shift from the agricultural sector towards the non-agricultural sectors. It was observed by the decrease in output shares of agriculture and increase in manufacturing and service sector shares of GDP (Chart 2).



Source: WDI (2021)

Moreover, Indonesia's economic growth pattern was dominated by domestic demand, capital formation, and export expansion (Akita & Hermawan, 2000; Hayashi, 2005).

APPLICATIONS FOR PRACTICE

- Structural changes occurred in Indonesia during 1995–2005 from agricultural towards non-agricultural sectors.
- There was a change in the pattern of growth in Indonesia from expansion of exports towards investment demand.
- The government needs to boost the investment climate and enhance the adoption of technology and know-how into the country to internalise the knowledge and skills which can benefit the country to escalate a higher-productivity and producing high value of export commodities.

Based on the historical data on growth and GDP shares, for most of the periods, Indonesia maintained its positive economic growth and expanded the economy. However, structural reform is required for Indonesia to move towards higher growth and development, measured by structural change in the economy. Also, Indonesia should be able to escape from the middle-income trap, which occurs when a country experiences a growth slowdown after successfully being in the middle-income status (Eichengreen et al., 2013) or caused by a developmental trap when a country fails to internalize the skills and technology to upgrade into the industrialization stage (Ohno, 2009). In addition, sources of growth should be identified to confirm whether the specific changes occurred in Indonesia.

Therefore, the objective of this study was to examine the structural changes and to analyzethe pattern of economic growth in Indonesia. This study also conducted a comparative analysis with Malaysia and Thailand, as two neighboring countries. The comparative analysis included the comparison of structural changes and patterns of growth in Indonesia with Malaysia and Thailand utilizing the Asian International Input-Output Table. These two countries were chosen because of the relatively similar country characteristics, the trading partnership with Indonesia, which causes the linkage effect of commodities traded in these countries, the close geographical proximity to each other, and the experience of the Indonesia-Malaysia-Thailand Growth Triangle (IMT-GT) (Thant et al., 1996).

LITERATURE REVIEW

Economic growth has been the primary interest of many schools of thought that gave birth to numerous theories on economic growth, including an evolutionary theory of modern economic growth by Kuznets (1973). He defined economic growth as a long-term increase in one country's capacity to supply goods to its population supported by the advanced technology and the adjustments in institutional and ideological of the nation (Kuznets, 1973). Six characteristics contribute to the modern economic growth, namely the high rates of per capita growth and of population, the increase in productivity, a high structural transformation of the economy, a rapid change of social structures and its ideology, an integration to the world utilizing transportation and communication, and modern technology (Kuznets, 1973).

That being said, one of the characteristics of economic growth is the structural change in the country's industries and sectors (Wang et al., 2014). Moreover, Echevarria (1997) explains that economic growth is affected by the sectoral composition or vice versa. The structural change indicates that several industries, or sectors, are having a faster long-term growth than other sectors, which cause shifts in their shares in the total output of an economy (Krüger, 2008). Also, the economic expansion leads to the decline in demand for farms goods and labor (Caselli & Coleman, 2001) and is the result of industrialization that happened by escalating labor from lower-productivity economic activities (e.g. agriculture) toward higher-productivity activities (e.g. manufacturing) (Cortuk & Singh, 2015; Dennis & İşcan, 2009; Felipe et al., 2007; McMillan & Rodrik, 2011). Industrialization, especially in the manufacturing sector, is an engine of growth in developing countries (Felipe et al., 2007; Szirmai, 2012).

Decomposition of economic growth into sectoral components can be used to comprehend the country-specific factors that lead to structural changes (Diao et al., 2019). Researchers have attempted to analyze structural changes and the patterns of economic growth. Most of these analyses were conducted utilizing the Input-Output table with Structural Decomposition Analysis (Akita & Hau, 2006; Akita & Hermawan, 2000; De Vries et al., 2015; Hayashi, 2005; Tandon & Ahmed, 2015; Teng, 1996; Zakariah & Elameer, 1999). Only a few studies were conducted using the Deviation from Proportional Growth (hereafter DPG) analysis; these include a pioneered work by Chenery et al. (1962), an analysis by Kuang-hui & Fujikawa (1992), and Nguyen & Chen (2016). A DPG analysis is a hypothetical analysis used to understand better the structural change of a country that assumes a virtual economic structure instead of actual output from each period of the I-O Table.

Another stream of research analyses structural changes and economic growth using different methods, e.g. Cortuk & Singh (2015) used regression analysis. They observed the structural change and its relationship with the economic growth in the Indian economy, and Vu (2017) applied the panel data using the new approach called effective structural change. Researchers recently see the structural change from the lens of resource movement from one sector to another using labor productivity growth (Caselli & Coleman, 2001; Dennis & İşcan, 2007, 2009; Diao et al., 2019; McMillan & Rodrik, 2011).

In addition, research on this area also grouped into structural change that happened in developed countries (Caselli & Coleman, 2001; Chenery et al., 1962; Dennis & İşcan, 2007, 2009; Kuang-hui & Fujikawa, 1992) versus developing countries (Akita & Hau, 2006; Akita & Hermawan, 2000; Cortuk & Singh, 2015; De Vries et al., 2015; Fan et al., 2003; Hayashi, 2005; Nguyen & Chen, 2016; Nguyen, 2018; Tandon & Ahmed, 2015; Teng, 1996; Zakariah & Elameer, 1999). Also, the researchers were either observing one jurisdiction (Akita & Hermawan, 2000; Caselli & Coleman, 2001; Chenery et al., 1962; Cortuk & Singh, 2015; Dennis & İşcan, 2007, 2009; Diao et al., 2019; Fan et al., 2003; Hayashi, 2005; Nguyen, 2018; Tandon & Ahmed, 2015; Teng, 1996; Zakariah & Elameer, 1999) or comparing them (Akita & Hau, 2006; De Vries et al., 2015; Diao et al., 2019; Kuang-hui & Fujikawa, 1992; McMillan & Rodrik, 2011; Nguyen & Chen, 2016).

The seminal work by Chenery et al. (1962) started the discussion on economic growth from demand factors and import substitutions and observed the pattern of growth and the structural changes in Japan. They concluded that the primary driving force of Japan's growth pattern was the rapid increase in industry, which brought Japan into the phase of industrialization.

The growth factor decomposition analysis was applied by Akita & Hermawan (2000) and Hayashi (2005) to observe structural change and sources of industrial growth in Indonesia as indicated by the decrease in the agricultural sector and the increase in some of the outputs of the manufacturing sectors (Akita & Hermawan, 2000). The pattern of output growth in Indonesia was primarily driven by household consumption, followed by capital formation and export expansion. Also, export demand was the primary source of output growth in Indonesia (Hayashi, 2005). In addition, Hayashi (2005) concluded that the agricultural and service industries declined in gross output, while the manufacturing sector increased. This result was also confirmed by Saliminezhad & Lisaniler (2018) in their study, which concluded that the manufacturing sector in Indonesia is the most strategic sector.

Teng (1996) studied China's economic growth and structural changes by applying Syrquin's factor analysis model that required the separation of import matrix and the use of the non-competitive import type I-O Table. The results revealed that

China's economic growth and structural changes during the high growth period were driven by final domestic demand, namely consumption and fixed capital formation (investment).

Zakariah & Elameer (1999) conducted research using the Structural Decomposition method to examine the structural change in Malaysia. The export expansion provided a significant contribution to the economy with the most export-oriented sectors were agriculture, light industry, and heavy industry. A similar study was conducted by Tandon & Ahmed (2015) to analyze the source of Indian economic growth and found that the economic expansion was driven by the increase in domestic demand and export expansion.

The studies above only applied to one country as an observation. Multicountry analysis was conducted by Akita & Hau (2006) to observe the structural change and source of growth in the Vietnamese economy and compare it with the Indonesian and Malaysian economies. The study followed the standard growth factor decomposition method (Chenery & Syrquin, 1980), and the result illustrated that there was a shift away in the Vietnamese, Indonesian, and Malaysian economies, indicating that these countries experienced a similar structural change by shifting from agriculture to manufacturing.

Kuang-hui & Fujikawa (1992) compared the growth pattern of the Japanese economy with those of Korea and Taiwan using DPG analysis and found that during the pre-war period, Japanese growth was dominated by its manufacturing and construction sectors. The after-war period was characterized by heavy industry development, primarily focused on the machinery sector.

Nguyen & Chen (2016) also applied their DPG analysis to observe the sources of growth in Vietnam and compare it to the more industrialized economies such as Taiwan, Japan, and Korea. The result shows that the manufacturing sector in Vietnam still needs more improvement by internalizing the technologies to catch up with neighboring countries.

To date, no DPG analyses have been applied to Indonesia. Consequently, this current study will continue the previous researchers (Akita & Hermawan, 2000; Hayashi, 2005) to observe the pattern of growth in Indonesia. Also, the study will conduct a comparative analysis with the neighboring countries of Malaysia and Thailand. Notwithstanding the previous studies, this study will conduct the DPG analysis by combining the model of DPG using a competitive import type I-O table by Kuang-hui & Fujikawa (1992) with the model of Structural Decomposition using a non-competitive import type I-O Table by Teng (1996).

RESEARCH METHODOLOGY

The data used for this study were obtained from the Asian International Input-Output (I-O) Table, published by IDE-Jetro, for 1995, 2000 and 2005, for Indonesia, Malaysia, and Thailand, based upon the latest publicly available data. The I-O Table provides information on each of the economic sectors of a country. Thus, it is a popular tool used to analyze the economic structure (Bekhet, 2013). The original Asian International I-O Table of 1995 consists of 78 economic sectors; the I-O Table of 2000 and 2005 consists of 76 economic sectors. The data for the National I-O Table were extracted for Indonesia, Malaysia, and Thailand and deflated into the constant prices to obtain the actual changes, instead of the nominal changes (Zakariah & Elameer, 1999) using GDP deflator from the World Development Indicators. The base year of the GDP deflator varies among the countries. For example, the base year of Indonesia is 2000, the base year of Malaysia is 2005, and the base year of Thailand is 1988. Therefore, the National I-O Table for each country was aggregated into 26 sectors.

The analysis used in this study is based on the concept by Chenery (1960), who explained the DPG for each industry. Chenery calculated the deviation in the output composition for each sector and broke down the deviation into several components. This concept is called a DPG analysis. Based on this concept and by utilizing the I-O Table, researchers expanded the method to identify the growth pattern in an economy. For this study, the methodology used will be based on Kuang-hui & Fujikawa (1992) and Teng (1996).

The SDA accounted for the real change in the output composition in t+1 and the output composition in period t. The DPG analysis assumes proportional growth of the λX_t, which is a hypothetical economic structure. The difference between the output composition in t+1 and its proportional growth is known as the DPG.

The DPG analysis counts the level of change in the sectors' production composition in terms of the deviation from its proportional growth (Kuang-hui & Fujikawa, 1992). The deviation, δX, is a vector of the DPGs, defined in Equation (1) as follows:

$$\delta X = X_{t+1} - \lambda X_t \qquad (1)$$

where:

X_t, X_{t+1} : The column vectors, where each element is the gross production of each sector in t and t+1.

λ : The scalar, which represents the (weighted) average ratio of the expansion of production, obtained by the division of the total gross production in t+1 by that of period t. λ is considered a virtual economic structure:

$$\lambda = \frac{\sum X_{t+1}}{\sum X_t}$$

Each element in the δX is the DPG of each sector. It is zero when the expansion ratio of the sector is equal to the average ratio (λ). This condition illustrates the proportional growth of a sector. δX is positive when a sector has expanded faster than the average ratio(λ). It is negative when a sector has decelerated from the average ratio(λ). In summary, the sign describes whether the sector has increased its output share or not. Moreover, the absolute value of the DPG relies on the real growth rate and the sector's production level.

The δX is decomposed into several factors in Equation (2) as follows.

$$X_t = (\mathrm{I} - M_t)(A_t^d X_t + C_t + If_t + J_t) + E_t \quad (2)$$

where:

*	:	Hadamard product of matrices (Kuang-hui & Fujikawa, 1992)
A_t^d	:	The matrix of input coefficients
I	:	The identity matrix
C_t, If_t	:	The vectors of the final consumption and investment
J_t, E_t	:	The vectors of the increases in the stocks and of the exports of the domestic products
M_t	:	The diagonal matrix of the (i,i)th element, which is the import coefficient of the i-th domestic demand, which is the total of intermediate, consumption, and investment demand and an increase in stocks

Based on Equation (2), there are five decomposition factors of the output (production) of each sector:

1. intermediate demand for domestic industries;
2. consumption demand;
3. investment demand;
4. increase in stocks; and
5. export of domestic goods and services.

Equation (2) describes that the production of each sector is equal to the sum of demand for domestic products. Solving Equation (2) for X_t provides Equation (3) as follows.

$$X_t = [\mathrm{I} - (\mathrm{I} - M_t)A_t^d]^{-1}[(\mathrm{I} - M_t)(C_t + If_t + J_t) + E_t] \quad (3)$$

Substituting Equation (3) into Equation (1) to generate the decomposition formula yields Equation (4) as follows:

$$\delta X = B_{t+1}(I - M_{t+1})\delta C + B_{t+1}(I - M_t)\delta If + B_{t+1}(I - M_t)\delta J + B_{t+1}\delta E + B_{t+1}(M_t - M_{t+1})\lambda (A_t X_t + C_t + If_t + J_t) + B_{t+1}(\mathrm{I} - M_{t+1})(A_{t+1} - A_t)\lambda X_t \quad (4)$$

where:

B_{t+1}	:	$[\mathrm{I} - (\mathrm{I} - M_{t+1})A_{t+1}]^{-1}$
δC	:	$C_{t+1} - \lambda C_t$
δIf	:	$If_{t+1} - \lambda If_t$
δJ	:	$J_{t+1} - \lambda J_t$
δE	:	$E_{t+1} - \lambda E_t$

This model decomposed δX into six factors: the effects of the deviations of the final demand, δC, δIf, δJ, the effect of deviation of export, δE, the effects of the changes in the import coefficients,$M_t - M_{t+1}$and the effect of the changes in the input coefficients, which is also called the technological change, $A_{t+1} - A_t$.

The model was applied to the competitive import type I-O Table. The sum of imports was included in the table. The total output is the total intermediate demand, final demand, and net trade (exports minus imports). However, this study used the Asian International I-O Table, the non-competitive import type I-O Table. The total output in Asian International I-O Table is the summation of the domestic intermediate demand, domestic final demand, and exports. Therefore, the model proposed by Kuang-hui and Fujikawa (1992) should be modified to account for the non-competitive import type I-O Table.

Teng (1996) used the model by Syrquin (1988) to disaggregate the economic growth into several factors: final demand, exports, import substitution and input coefficients (technological changes). Then, Teng applied Syrquin's decomposition model to the non-competitive import type I-O Table using the SDA. In this model, the import substitution is decomposed into the import intermediate demand and the import final demand. In addition, Syrquin (1988) separated the domestic I-O Table, which consists of the domestic intermediate demand and the domestic final demand from the import matrix to investigate the domestic industry thoroughly. Therefore, the identity equation for the supply and demand of each total output in the t period is written in Equation (5) as follows.

$$X_t = A_t^d X_t + F_t^d + E_t$$
$$(I - A_t^d)X_t = F_t^d + E_t$$
$$X_t = (I - A_t^d)^{-1} (F_t^d + E_t) \quad (5)$$

The import dependency ratio of the final demand in each sector is defined in Equation (6) as follows.

$$m_{jt}^F = \frac{(F_{jt} - F_{jt}^d)}{F_{jt}} \quad (j=1, ..., n)$$
$$F_t^d = F_t - M_t F_t = (I - M_t)F_t \quad (6)$$

where:

A_t^d	:	Input coefficient matrix of domestically produced goods
F_t^d	:	Final demand matrix of domestically produced goods

F_t : Final demand matrix of domestically produced goods and imported goods
M_t : The diagonal matrix of the final import demand dependency ratio

Taking into account $B_t^d = (I - A_t^d)^{-1}$ as the inverse matrix of the input coefficient matrix of domestically produced goods, then Equation (5) can be rewritten in Equation (7) as follows.

$$X_t = B_t^d((I - M_t)F_t + E_t) \quad (7)$$

Since this research is using the DPG model thus the model of Kuang-hui & Fujikawa (1992) is combined with Teng (1996) to derive the DPG for the non-competitive import type I-O Table, as follows:

$$\delta X = X_{t+1} - \lambda X_t$$

Substituting Equation (7) into the above Equation of the DPG enables the creation of Equation (8) as follows.

$$\delta X = B_{t+1}^d((I - M_{t+1})F_{t+1} + E_{t+1}) - \lambda B_t^d((I - M_t)F_t + E_t) \quad (8)$$

The DPG equation can be obtained by using the terminal year structural parameter, B_{t+1}^d and M_{t+1} and base year volume weights, F_t, E_t, and M_t in Equation (9) as follows.

$$\delta X = B_{t+1}^d(I - M_{t+1})\delta F + \lambda B_{t+1}^d(M_t - M_{t+1})F_t + [B_{t+1}^d - B_t^d]\lambda [(I - M_t)F_t + E_t + SD_t] + B_{t+1}^d\delta E \quad (9)$$

where:

$\delta F = F_{t+1} - \lambda F_t$

$\delta E = E_{t+1} - \lambda E_t$

The third part of Equation (9) can be re-arranged as follows:

$$[B_{t+1}^d - B_t^d]\lambda [(I - M_t)F_t + E_t] = B_{t+1}^d[(B_t^d)^{-1} - (B_{t+1}^d)^{-1}]B_t^d \lambda [(I - M_t)F_t + E_t]$$

Substituting Equation (7) into the above equation yields Equation (10) as follows.

$$B_{t+1}^d[(B_t^d)^{-1} - (B_{t+1}^d)^{-1}]B_t^d \lambda [(I - M_t)F_t + E_t] = B_{t+1}^d(A_{t+1}^d - A_t^d) \lambda X_t \quad (10)$$

Substituting and re-arranging Equation (10) back into Equation (9) yields Equation (11) as follows.

$$\delta X = B_{t+1}^d(I - M_{t+1})\delta F + B_{t+1}^d(M_t - M_{t+1})\lambda F_t + B_{t+1}^d(A_{t+1}^d - A_t^d)\lambda X_t + B_{t+1}^d\delta E \quad (11)$$

Equation (11) decomposes δX into four factors: (a) the effect of the deviations of domestic final demand, δF; (b) the effect of the import substitution on domestic final demand $(M_t - M_{t+1})$; (c) the effect of the input coefficient or technological changes $(A_{t+1}^d - A_t^d)$, and (d) the effect of the deviations of exports, δE.

Furthermore, the effect of the deviation of domestic final demand, δF, can be decomposed into private consumption C, government consumption G, gross fixed capital formation I_f, and changes in stock J in Equation (12) as follows.

$$B_{t+1}^d(I - M_{t+1})\delta F = B_{t+1}^d(I - M_{t+1})\delta C + B_{t+1}^d(I - M_{t+1})\delta G + B_{t+1}^d(I - M_{t+1})\delta I_f + B_{t+1}^d(I - M_{t+1})\delta J \quad (12)$$

Finally, the DPG can be decomposed into Equation (13) as follows.

$$\delta X = B_{t+1}^d(I - M_{t+1})\delta C + B_{t+1}^d(I - M_{t+1})\delta G + B_{t+1}^d(I - M_{t+1})\delta I_f + B_{t+1}^d(I - M_{t+1})\delta J + B_{t+1}^d(M_t - M_{t+1})\lambda (C_t + G_t + If_t + J_t) + B_{t+1}^d(A_{t+1}^d - A_t^d) \lambda X_t + B_{t+1}^d\delta E \quad (13)$$

(1) The effect of the deviation of private consumption in final demand, δC;
(2) The effect of the deviation of government consumption in final demand, δG;
(3) The effect of the deviation of gross fixed capital formation in final demand, δI_f;
(4) The effect of the deviation of changes in the stock in final demand, δJ;
(5) The effect of the import substitution on final demand, $(M_t - M_{t+1})$;
(6) The effect of the input coefficient or technological changes $(A_{t+1}^d - A_t^d)$; and
(7) The effect of the deviations on exports, δE.

The aggregated constant prices of the 26-sector I-O tables were analysed using Matlab software to obtain the DPGs of each sector and the sources of each DPGs. The sources of the DPGs or pattern of growth include the deviation of final demand, which can be further decomposed into the deviation of private consumption (C), government consumption (G), gross fixed capital formation or investment (If), the change in stocks or inventory (J), the deviation of exports (E), and two changes in the coefficient, namely the import coefficient (M), to indicate import substitution, and the input coefficient (A), to indicate the technological changes.

RESULT AND DISCUSSION

Table 1 illustrates the results of the DPG analysis. The first column shows the DPG of each sector. The negative (positive) DPG illustrates a decrease (increase) in the output shares of a particular sector. The value of the DPG of each sector illustrates structural changes that occurred in the country during the observed years. The remaining columns of the table indicate the pattern of growth of each country.

Table 2 indicates the DPGs of each sector in Indonesia from 2000 to 2005 and the source of each DPG or growth pattern. This result indicated that Indonesia was experiencing a structural change by shifting away from the agricultural sectors towards the non-agricultural sectors. This result confirmed the previous research (Akita & Hau, 2006) that a structural change occurred in Indonesia during 1985-1995 from the agricultural sector toward the manufacturing sector. Furthermore, the agricultural sector declined while the manufacturing sector increased, which confirms Hayashi (2005) and aligns with Szirmai (2012) argument that manufacturing continues to be an engine of growth in developing countries. Export expansion became the most significant factor in output growth between 1995 and 2000, with the manufacturing sector experiencing the largest source of export expansion. On the contrary, consumption and investment became the negative factors of output growth during this period.

Table 3 shows the comparison between a DPG analysis and the real change for Indonesia between 1995 and 2000. The results reveal a difference between the results obtained from the DPG analysis compared with the real output change for the mining and quarrying sector, manufacturing sector, and trade and transport sector. All of these sectors had a positive DPG value. Conspicuously, these sectors experienced decreases in the output share of 2000 compared to the output in 1995. However, according to the results of the DPG analysis, these sectors expanded faster than their proportional **growth (λ). The other sectors had negative values for the DPG analysis and real output change analysis, decreasing their output shares.**

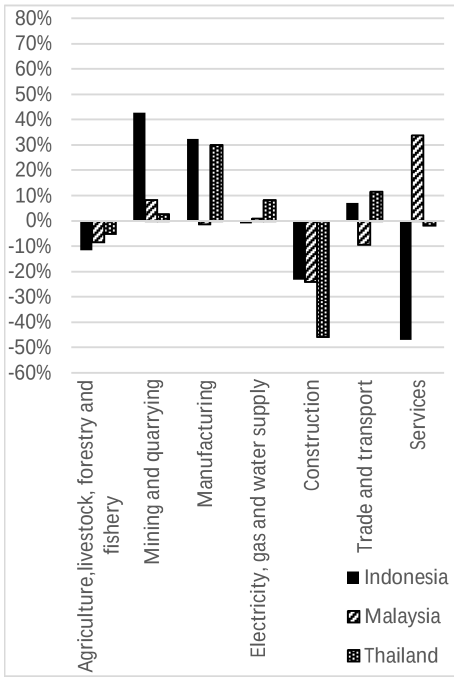
According to Table 4, Indonesia was still experiencing a structural change by shifting from agriculture to non-agricultural sectors. The decrease in output shares of the manufacturing sector was a surprising result because, based on the results from 1995–2000 and the results of the previous research in the prior period, the manufacturing sector increased its output share (Akita & Hermawan, 2000; Hayashi, 2005). The last row of Table 4 indicates that gross fixed capital formation or investment had the most significant share of positive deviation for Indonesia. All economic sectors received a positive deviation from the investment, indicating a significant amount of new investment flows into Indonesia from 2000 to 2005. The second major factor of the positive deviation in the Indonesian growth pattern was the import coefficient, which indicated an import substitution taking place during this period. It occurred if the domestic production of similar products replaced that of the foreign supplier (Ahmad, 1978).

Table 5 explains the difference between the results of the DPG analysis and the real output change for Indonesia from 2000–2005. Both outcomes illustrated that most sectors increased their output shares except agricultural, livestock, forestry, fishery, mining and quarrying, and manufacturing.

Table 6 explains that from 1995 to 2000, Malaysian growth was characterized by the expansion of the services sector. This result indicates that structural changes occurred in Malaysia during 1995–2000. The decomposition of output growth showed that the largest contributor to growth was export expansion and private consumption. The export expansion was dominated by the manufacturing and services sector. Meanwhile, private consumption was contributed mainly by the services sector. This result was similar to Zakariah & Elameer (1999).

Table 7 conspicuously illustrates that all economic sectors were moving in the same direction for the DPG and real output change analyses. The agricultural, livestock, forestry and fishery, manufacturing, construction, trade and transport sectors decreased their output shares during 1995–2000.

Chart 1. Comparison of the DPG of Each Economic Sector
in Indonesia, Malaysia, and Thailand
(1995–2000)



Source: Author's calculation

Table 8 provides the results of the DPG decomposition for Malaysia during 2000–2005. The able shows that the trade and transportsector and services sector contributed to the positive DPG during 2000–2005. The most significant source of the expansion was the deviation of input coefficient or technological change. Exports during this period experienced a contraction, where the manufacturing sector suffered the most. In addition, investment was negative in Malaysia from 2000 to 2005, especially in the manufacturing and construction sectors.

Table 9 illustrates the difference in output shares of each economic sector during 2000–2005 between the DPG analysis and real output change analysis. The agricultural, livestock, forestry and fishery sectors, manufacturing sectors, electricity, gas, water supply sectors, and construction sectors experienced a deceleration from their proportional growth during 2000–2005.

Table 10 explains that from 1995–2000, there was an increase in output growth from the manufacturing sector, trade and transport sector, and electricity, gas, and water supply sector in Thailand. There was also a decrease in the output shares of the agricultural, livestock, forestry and fishery sectors, the construction sector, and the services sector, indicating a structural change in Thailand from 1995–2000. The decomposition of the output growth from 1995 to 2000 indicated that the primary source of output growth in Thailand was derived from the export expansion, especially in the manufacturing sector.

Table 11 indicates that some economic sectors went in the same direction; this was not true for the manufacturing sector and the trade and transport sectors. However, as indicated on the positive results of the DPG analysis, both sectors accelerated from their proportional growth.

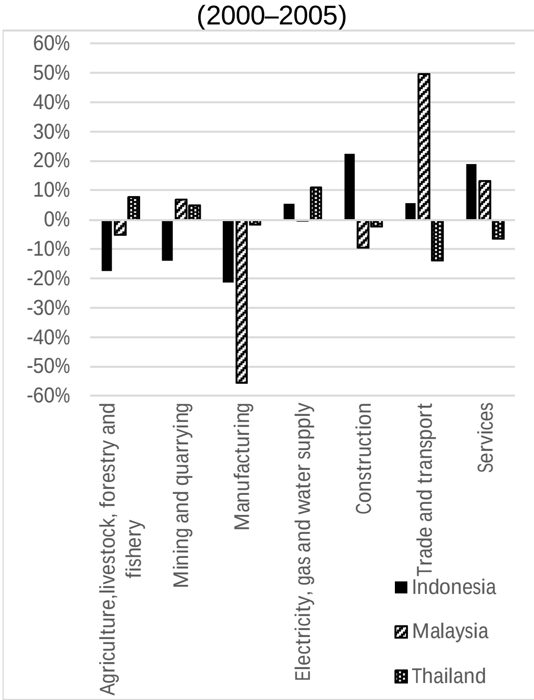
Table 12 shows the results of the DPG for Thailand during 2000–2005. The agricultural, livestock, forestry and fishery sector, mining and quarrying sector, and electricity, gas and water supply sector increased their output shares. The input coefficient contributed to the pattern of growth. This result illustrates that the technological change continued its positive path in Thailand during 2000–2005, especially in the services sector. From 2000–2005, the new investment in the manufacturing sectors had just started to grow. Meanwhile, export experienced a contraction from 2000 to 2005 in Thailand, where the manufacturing sector experienced the most significant contraction. The same result was found in Malaysia.

Based on the real change calculation, all economic sectors increased their output shares from 2000 to 2005, as shown in Table 13. However, based on the hypothetical analysis of the DPG, the manufacturing sector, construction sector, trade and transportation sector, and services sector decelerated from their proportional growth, as indicated by the negative DPGs.

Chart 1 illustrates the comparison of the DPG among each economics sector from 1995–2000. In general, in Indonesia, Malaysia, and Thailand, the agricultural, livestock, forestry and fishery sector decreased their output shares. Moreover, in Indonesia and Thailand, the manufacturing sector increased its output shares. In Malaysia, the output shares were dominated by the services sector. The structural changes occurred in the three countries from the agricultural sector to the non-agricultural sector, which confirmed Caselli & Coleman (2001) that the first mechanism for structural transformation happens when the demand for farm goods and labor declines.

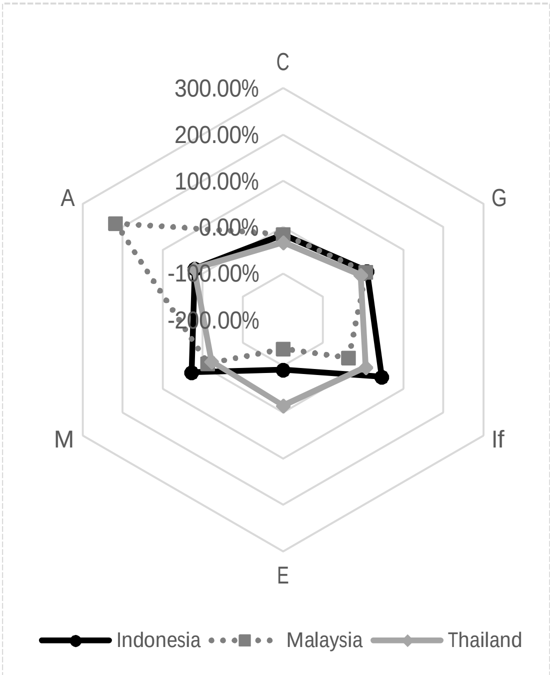
Thailand and Malaysia were found to have had the same increase in the output shares of the electricity, gas, and water supply sector, but it was negative in Indonesia. In addition, the mining and quarrying sector also experienced an increase in the output shares, but the construction sector experienced a decline in the output shares in all of the countries. The trade and transport sector increased its output shares in Indonesia and Thailand but decreased its output shares in Malaysia. On the contrary, the services sector

Chart 2. Comparison of the DPG of Each Economic Sector
in Indonesia, Malaysia, and Thailand
(2000–2005)



Source: Author's calculation

Chart 4. Comparison of the Pattern of Economic Growth in Indonesia, Malaysia, and Thailand (2000–2005)



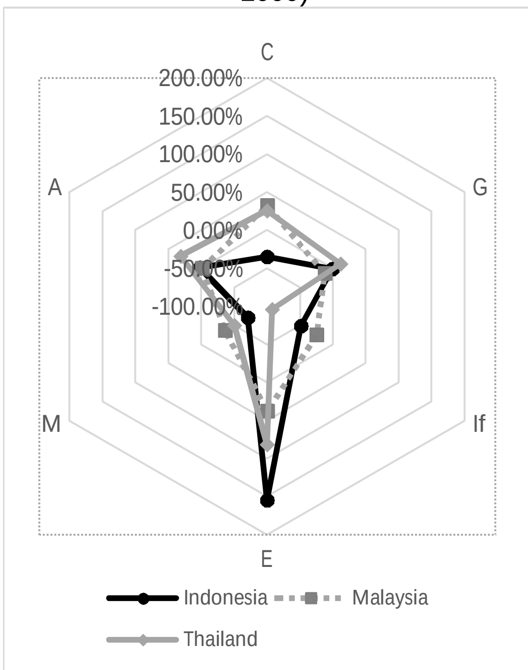
A = Technological change
M = Import substitution
E = Export Expansion
If = Investment
G = Government consumption
C = Consumption Demand

Source: Author's calculation

increased its output shares in Malaysia while decreasing its output shares in Indonesia and Thailand.

Chart 2 compares the DPG from each economic sector from Indonesia, Malaysia, and Thailand during 2000–2005. Indonesia and Malaysia had negative output shares of the agricultural, livestock, forestry, and fishery sector during 2000–2005, but Thailand experienced positive output shares in this sector. The mining and quarrying sector in Malaysia and Thailand had positive output shares, while this sector had negative output shares in Indonesia. During 2000–2005, Indonesia, Malaysia, and Thailand had negative output shares in the manufacturing sectors. The electricity, gas and water supply sectors in Indonesia and Thailand had a positive deviation but decreased their output shares in Malaysia. Malaysia and Thailand experienced negative output shares for the construction sector during 2000–2005, but this sector experienced positive shares in Indonesia. Indonesia and Malaysia increased their output shares in the trade and transport sector, but it decreased in Thailand. In addition, Thailand experienced declining shares in the output of the services sector.

Chart 3. Comparison of the Pattern of Economic Growth in Indonesia, Malaysia, and Thailand (1995–2000)



A = Technological change
M = Import substitution
E = Export Expansion
If = Investment
G = Government consumption
C = Consumption Demand

Source: Author's calculation

Chart 3 illustrates that Indonesia, Malaysia, and Thailand had almost similar economic growth patterns from 1995–2000. The export expansion (E) contributed as the dominant factor in output growth in all countries. On the contrary, import substitution (M) became a negative source of growth in all countries during this period. In Malaysia and Thailand, the second most significant factor of output growth was the private consumption demand (C). However, for Indonesia, private consumption had a negative contribution to output growth. From 1995–2000, investment (If) became a negative source of output growth in all countries, indicating an outflow of investment. Lastly, government consumption (G) in Indonesia and Malaysia experienced a negative deviation from output growth. This differed from Thailand's, where government consumption became a positive source of output growth during this period.

Chart 4 shows the different growth patterns among the three countries during 2000–2005. The growth in Malaysia was dominated by technological change; the growth in Indonesia was dominated by investment demand, import-substitution, and technological change. Thailand's growth was contributed by its technological change and investment. In all countries, private consumption became a negative source of growth, while government consumption became a positive source of growth in both Indonesia and Malaysia. On the contrary, government consumption became a negative source of growth in Thailand. In addition, export expansion experienced negative growth in all of the observed countries, assuming that the countries were still being affected by the AFC.

CONCLUSION

The results illustrated that structural changes occurred in Indonesia during the observation period; this was observed in the decrease in the output shares of the agricultural sector and the increase in the non-agricultural sectors. Furthermore, there was a change in Indonesia's growth pattern from 1995–2000 to 2000–2005. From 1995 to 2000, the pattern of output growth was contributed by the expansion of exports, especially in the manufacturing sector, which contributes to the economic growth. However, from 2000 to 2005, the pattern of Indonesian growth shifted from export expansion towards a fixed capital formation (investment demand). As a result, every sector received a positive benefit from the investment growth, indicating a positive investment inflow into the country.

The same analysis was applied to Malaysia and Thailand; the results were being compared among the countries. The comparison showed that a structural change occurred in the three countries. From 1995 to 2000, the services sector increased its output shares in Malaysia, followed by the mining and quarrying sector. This output composition shifted from 2000 to 2005, as indicated by the trade and transport sector, with the most significant increase in output shares. On the contrary, from 1995 to 2000, there was an increase in output shares from the manufacturing sector, trade and transport sector, and electricity, gas, and water supply sector in Thailand. During 2000–2005, a positive deviation in output shares came from the agricultural, livestock, forestry, fishery, mining and quarrying, and electricity, gas, and water supply sectors. A comparison of the growth pattern among the three countries illustrated that during 1995–2000, an export expansion became the significant source of growth in all of the observed countries. The second source of growth came from the technological change, which occurred in Indonesia and Thailand. Another source of growth was private consumption demand in Malaysia and Thailand. During 1995–2000, investment demand and import substitution became a negative source of output growth in all countries. This result indicates that during 1995–2000, they applied an export-oriented policy to accelerate their economic growth and become more industrialized countries.

This study has several limitations. First, the GDP deflator obtained from the WDI assumed only one single price each year for all of the economic sectors. Therefore, future research may utilize the specific industry price index from each country for the deflation from the current price to the constant price to account for the unique characteristic from different sectors. Second, the latest available data for the Asian International I-O Table were published by IDE-Jetro in 2005; this data did not cover the period after the Global Financial Crisis. The pattern of economic growth for each country have changed after the Global Financial Crisis. Hence, future research may consider analyzing the period after the Global Financial Crisis, based upon the availability of the latest Asian International I-O Table. Third, future researchers in this area can focus on one country analysis by utilizing the national input-output table from Indonesia. Lastly, an attempt to decompose the economic growth and its pattern can also consider the alternative method of Structural Decomposition Analysis.

REFERENCE

Ahmad, J. (1978). Import substitution: A survey of policy issues. *The Developing Economies, 16*(4), 355-372.

Akita, T., & Hau, C. T. T. (2006). *Inter-sectoral interdependence and growth in Vietnam: A comparative analysis with Indonesia and Malaysia* (No. EMS_2006_03, Issue.

Akita, T., & Hermawan, A. (2000). The Sources of Industrial Growth in Indonesia, 1985–95: An Input-Output Analysis. *ASEAN Economic Bulletin, 17*(3), 270-284.

Bekhet, H. A. (2013). Assessing structural changes in the Malaysian economy: I–O approach. *Economic Modelling, 30*, 126-135.

Caselli, F., & Coleman, W. J. (2001, 2001-06-01). The U.S. Structural Transformation and Regional Convergence: A Reinterpretation. *Journal of Political Economy, 109*(3), 584-616. https://doi.org/10.1086/321015

Chenery, H., & Syrquin, M. (1980). A comparative analysis of industrial growth. In *Economic growth and resources* (pp. 223-257). Palgrave Macmillan.

Chenery, H. B. (1960). Patterns of industrial growth. *The American economic review, 50*(4), 624-654.

Chenery, H. B., Shishido, S., & Watanabe, T. (1962, 1962-01-01). The Pattern of Japanese

Growth, 1914-1954. *Econometrica, 30*(1), 98. https://doi.org/10.2307/1911290

Cortuk, O., & Singh, N. (2015). Analysing the Structural Change and Growth Relationship in India: State-level Evidence. *Economic and Political Weekly, 50*(24), 91-98.

De Vries, G., Timmer, M., & De Vries, K. (2015, 2015-06-03). Structural Transformation in Africa: Static Gains, Dynamic Losses. *The Journal of Development Studies, 51*(6), 674-688. https://doi.org/10.1080/00220388.2014.997222

Dennis, B. N., & İşcan, T. B. (2007, 2007-03-01). Productivity growth and agricultural out-migration in the United States. *Structural Change and Economic Dynamics, 18*(1), 52-74. https://doi.org/10.1016/j.strueco.2005.11.003

Dennis, B. N., & İşcan, T. B. (2009, 2009-04-01). Engel versus Baumol: Accounting for structural change using two centuries of U.S. data. *Explorations in Economic History, 46*(2), 186-202. https://doi.org/10.1016/j.eeh.2008.11.003

Diao, X., Mcmillan, M., & Rodrik, D. (2019). The Recent Growth Boom in Developing Economies: A Structural-Change Perspective. In *The Palgrave Handbook of Development Economics* (pp. 281-334). Springer International Publishing. https://doi.org/10.1007/978-3-030-14000-7_9

Echevarria, C. (1997, 1997-05-01). Changes in Sectoral Composition Associated with Economic Growth. *International Economic Review, 38*(2), 431. https://doi.org/10.2307/2527382

Eichengreen, B., Park, D., & Shin, K. (2013). *Growth slowdowns redux: New evidence on the middle-income trap* (0898-2937).

Fan, S., Zhang, X., & Robinson, S. (2003, 2003-08-01). Structural Change and Economic Growth in China. *Review of Development Economics, 7*(3), 360-377. https://doi.org/10.1111/1467-9361.00196

Felipe, J., Leon-Ledesma, M., Lanzafame, M., & Estrada, G. (2007). *Sectoral engines of growth in developing Asia: stylized facts and implications.*

Hayashi, M. (2005, 2005-03-01). Structural Changes in Indonesian Industry and Trade: An Input-Output Analysis. *The Developing Economies, 43*(1), 39-71. https://doi.org/10.1111/j.1746-1049.2005.tb00252.x

Krüger, J. J. (2008, 2008-04-01). Productivity and Structural Change: A Review of the Literature *Journal of Economic Surveys, 22*(2), 330-363. https://doi.org/10.1111/j.1467-6419.2007.00539.x

Kuang-hui, C., & Fujikawa, K. (1992). A DPG (deviation from the proportional growth) analysis of the Japanese, Korean and Taiwanese economies. *Journal of Applied Input-Output Analysis, 1*(1), 71-83.

Kuznets, S. (1973). Modern Economic Growth: Findings and Reflections. *The American economic review, 63*(3), 247-258.

McMillan, M. S., & Rodrik, D. (2011). *Globalization, structural change and productivity growth.*

Nguyen, C. V., & Chen, M. H. (2016). Pattern and sources of growth of the Vietnam economy: a deviation from proportional growth analysis. *Asian Economic and Financial Review, 6*(9), 547.

Nguyen, H. C. (2018). Empirical Evidence of Structural Change: The Case of Vietnam's Economic Growth. *Journal of Southeast Asian Economies, 35*(2), 237-256.

Ohno, K. (2009). Avoiding the middle-income trap: renovating industrial policy formulation in Vietnam. *ASEAN Economic Bulletin*, 25-43.

Saliminezhad, A., & Lisaniler, F. G. (2018, 2018-07-04). Validity of unbalanced growth theory and sectoral investment priorities in Indonesia: Application of feature ranking methods. *The Journal of International Trade & Economic Development, 27*(5), 521-540. https://doi.org/10.1080/09638199.2017.1398270

Syrquin, M. (1988). Patterns of structural change. *Handbook of development economics, 1*, 203-273.

Szirmai, A. (2012, 2012-12-01). Industrialisation as an engine of growth in developing countries, 1950–2005. *Structural Change and Economic Dynamics, 23*(4), 406-420. https://doi.org/10.1016/j.strueco.2011.01.005

Tandon, A., & Ahmed, S. (2015). An Analysis of Sources of Growth in the Indian Economy. *SSRN Electronic Journal*. https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2705296

Teng, J. (1996). Input-output analysis of economic growth and structural changes in China. *Journal of Applied Input-Output Analysis (Pan Pacific Association of Input-Output studies), 3*.

Thant, M., Tang, M., & T'ang, M. (1996). *Indonesia-Malaysia-Thailand growth triangle: theory to practice*. Asian Development Bank.

Vu, K. M. (2017, 2017-06-01). Structural change and economic growth: Empirical evidence and policy insights from Asian economies. *Structural Change and Economic Dynamics, 41*, 64-77. https://doi.org/10.1016/j.strueco.2017.04.002

Wang, F., Dong, B., Yin, X., & An, C. (2014, 2014-12-01). China's structural change: A new SDA model. *Economic Modelling, 43*, 256-266. https://doi.org/10.1016/j.econmod.2014.08.005

Zakariah, A., & Elameer, A. (1999). Source of industrial growth in the Malaysian manufacturing sector: A factor decomposition approach. *The Developing Economies, 37*(2), 164-196.

Table 1. Illustration of the Results of the DPG Decomposition for Indonesia (2000–2005)
(Constant: 1,000 US Dollars)

Code	Sectors	Deviation of					Change in the Coefficient	
		DPG	C	G	If	E	M	A
001	Agriculture, livestock, forestry, and fisheries	-5,006,976	-6,930,512	87,815	296,900	-270,515	35,201	2,089,947
002	Mining and quarrying	-4,002,731	162,151	28,063	718,252	-373,627	51,782	-3,707,271
003	Manufacturing	-6,112,727	-5,441,155	406,743	3,804,596	-20,173,919	2,604,263	11,501,548
004	Electricity, gas and water supply	1,584,972	869,878	32,159	114,679	-461,574	118,603	870,351
005	Construction	6,436,212	36,530	80,434	5,932,568	-74,469	97,514	352,260
006	Trade and transport	1,645,141	7,050,726	167,584	1,503,631	-3,583,874	1,652,567	-5,848,447
007	Services	5,456,110	-319,136	2,037,821	967,651	-1,586,178	3,576,011	648,438
	Total	0	-4,571,517	2,840,619	13,338,278	-26,524,157	8,135,941	5,906,826

Source: Author's calculation

Table 2. DPG Decomposition for Indonesia (1995–2000)
(per cent)

Code	Sectors	Deviation of					Change in the Coefficient	
		DPG	C	G	If	E	M	A
001	Agriculture, livestock, forestry and fisheries	-11.52	2.33	0.33	-0.98	4.48	-5.29	-10.83
002	Mining and quarrying	42.87	0.66	-0.06	-2.96	32.90	-2.45	15.20
003	Manufacturing	32.43	-2.99	-0.03	-9.74	90.52	-25.10	-18.70
004	Electricity, gas and water supply	-0.90	-1.32	-0.05	-0.37	1.50	-0.58	-0.15
005	Construction	-23.10	-0.38	-0.23	-21.75	0.68	-0.58	-0.86
006	Trade and transport	7.16	-13.48	0.15	-8.87	18.07	-13.30	23.87
007	Services	-46.94	-19.67	-1.40	-3.75	6.84	-23.03	-6.23
	Total	0.00	-34.86	-1.29	-48.43	154.98	-70.32	2.30

Source: Author's calculation

Table 3. Comparison of the DPG Analysis and the Real Changes for Indonesia
(1995–2000)

Code	Sectors	In constant prices (1,000 US Dollars)	
		DPG	Real Change
001	Agriculture, livestock, forestry, and fisheries	-3,198,492	-117,306,270
002	Mining and quarrying	11,899,575	-43,956,173
003	Manufacturing	8,999,779	-349,453,309
004	Electricity, gas and water supply	-250,412	-12,187,947
005	Construction	-6,410,384	-109,088,932
006	Trade and transport	1,987,660	-127,957,447
007	Services	-13,027,726	-224,715,980

Source: Author's calculation

Table 4. DPG Decomposition for Indonesia (2000–2005)
(per cent)

Code	Sectors	Deviation of					Change in the Coefficient	
		DPG	C	G	If	E	M	A
001	Agriculture, livestock, forestry and fisheries	-17.45	-24.15	0.31	1.03	-0.94	0.12	7.28
002	Mining and quarrying	-13.95	0.57	0.10	2.50	-1.30	0.18	-12.92
003	Manufacturing	-21.30	-18.96	1.42	13.26	-70.30	9.08	40.08
004	Electricity, gas and water supply	5.52	3.03	0.11	0.40	-1.61	0.41	3.03
005	Construction	22.43	0.13	0.28	20.67	-0.26	0.34	1.23
006	Trade and transport	5.73	24.57	0.58	5.24	-12.49	5.76	-20.38
007	Services	19.01	-1.11	7.10	3.37	-5.53	12.46	2.26
	Total	0.00	-15.93	9.90	46.48	-92.43	28.35	20.58

Source: Author's calculation

Tabl 5. Comparison of the DPG Analysis and the Real Changes for Indonesia (2000–2005)

Code	Description	In constant prices (1,000 US Dollars)	
		DPG	Real change
001	Agriculture, livestock, forestry, and fisheries	-5,006,976	201,376
002	Mining and quarrying	-4,002,731	611,343
003	Manufacturing	-6,112,727	13,169,039
004	Electricity, gas and water supply	1,584,972	2,142,761
005	Construction	6,436,212	10,581,296
006	Trade and transport	1,645,141	8,439,619
007	Services	5,456,110	14,030,736

Source: Author's calculation

Table 6 DPG Decomposition for Malaysia (1995–2000)
(per cent)

Code	Sectors	Deviation of					Change in the Coefficient	
		DPG	C	G	If	E	M	A
001	Agriculture, livestock, forestry and fisheries	-8.39	-2.72	-0.21	0.32	-8.59	-2.61	3.49
002	Mining and quarrying	8.37	1.29	-0.06	-0.76	3.80	-0.03	2.38
003	Manufacturing	-1.29	3.60	-1.18	-5.78	14.77	-23.40	7.99
004	Electricity, gas and water supply	0.88	0.75	-0.23	-0.32	-0.44	-0.66	1.75
005	Construction	-24.04	0.31	-0.07	-14.62	1.40	-0.23	-10.82
006	Trade and transport	-9.47	-4.78	-0.36	-2.76	7.48	-8.54	0.67
007	Services	33.93	33.84	-11.00	-1.60	19.12	-0.30	-5.79
	Total	0.00	32.28	-13.11	-25.52	37.52	-35.77	-0.33

Source: Author's calculation

Table 7. Comparison of the DPG Analysis and the Real Changes for Malaysia (1995–2000)

Code	Description	In constant prices (1,000 US Dollars)	
		DPG	Real change
001	Agriculture, livestock, forestry, and fisheries	-4,071,538	-5,333,940
002	Mining and quarrying	4,062,771	3,319,904
003	Manufacturing	-626,809	-13,511,110
004	Electricity, gas and water supply	428,882	22,520
005	Construction	-11,663,003	-13,734,043
006	Trade and transport	-4,593,856	-7,175,169
007	Services	16,463,553	13,218,530

Source: Author's calculation

Table 8. DPG Decomposition for Malaysia (2000–2005) (per cent)

Code	Sectors	Deviation of					Change in the Coefficient	
		DPG	C	G	If	E	M	A
001	Agriculture, livestock, forestry and fisheries	-5.07	-4.50	0.04	-0.60	-3.74	-0.13	6.86
002	Mining and quarrying	6.99	-2.05	0.10	1.16	-1.64	-7.81	10.22
003	Manufacturing	-55.38	-7.43	0.60	-11.39	-106.09	8.09	78.41
004	Electricity, gas and water supply	-0.04	2.47	0.10	-0.32	-1.16	-0.26	-0.82
005	Construction	-9.46	6.28	0.30	-23.82	-3.27	-1.57	11.92
006	Trade and transport	49.65	2.33	0.54	1.50	-21.43	2.94	71.61
007	Services	13.32	-11.58	4.90	-2.57	-0.43	-14.00	40.19
	Total	0.00	-14.47	6.58	-36.04	-137.76	-12.73	218.40

Source: Author's calculation

Table 9. Comparison of the DPG Analysis and the Real Changes for Malaysia (2000–2005)

Code	Description	In constant prices (1,000 US Dollars)	
		DPG	Real Change
001	Agriculture, livestock, forestry, and fisheries	-2,511,923	2,843,978
002	Mining and quarrying	3,464,850	9,551,039
003	Manufacturing	-27,465,448	45,793,359
004	Electricity, gas and water supply	-22,216	2,492,162
005	Construction	-4,691,583	1,830,874
006	Trade and transport	24,622,808	37,269,743
007	Services	6,603,511	32,606,254

Source: Author's calculation

Table 10. DPG Decomposition for Thailand (1995–2000)
(per cent)

Code	Sectors	Deviation of					Change in the Coefficient	
		DPG	C	G	If	E	M	A
001	Agriculture, livestock, forestry and fisheries	-5.17	0.90	-0.22	-0.62	0.58	-2.10	-0.90
002	Mining and quarrying	2.67	0.80	0.05	-3.30	1.88	-0.38	3.90
003	Manufacturing	30.17	8.02	0.80	-24.94	59.87	-27.61	17.62
004	Electricity, gas and water supply	8.40	3.40	0.24	-1.79	2.22	-1.30	5.59
005	Construction	-45.86	-0.55	0.03	-44.35	0.05	-0.06	-0.98
006	Trade and transport	11.57	3.49	0.24	-12.61	13.32	-5.53	12.58
007	Services	-1.78	9.19	10.29	-4.76	3.94	-13.13	-6.39
	Total	0.00	25.24	11.43	-92.38	81.86	-50.11	31.43

Source: Author's calculation

Table 11. Comparison of the DPG Analysis and the Real Changes for Thailand (1995–2000)

Code	Description	In constant prices (1,000 US Dollars)	
		DPG	Real Change
001	Agriculture, livestock, forestry, and fisheries	-1,217,541	-5,083,874
002	Mining and quarrying	629,045	3,257
003	Manufacturing	7,099,813	-22,837,734
004	Electricity, gas and water supply	1,976,139	430,511
005	Construction	-10,791,106	-17,012,721
006	Trade and transport	2,722,247	-7,896,817
007	Services	-418,598	-13,801,320

Source: Author's calculation

Table 12. DPG Decomposition for Thailand (2000–2005)
(per cent)

Code	Sectors	Deviation of					Change in the Coefficient	
		DPG	C	G	If	E	M	A
001	Agriculture, livestock, forestry and fisheries	7.78	4.00	-0.12	0.08	0.13	-0.15	-2.35
002	Mining and quarrying	5.02	0.17	-0.05	-0.14	3.00	0.94	1.46
003	Manufacturing	-1.60	-17.75	-0.73	8.91	-13.45	-3.86	-4.04
004	Electricity, gas and water supply	11.17	0.14	-0.20	0.17	-0.47	-0.60	7.48
005	Construction	-2.23	-0.11	-0.02	-2.84	0.01	-0.03	0.74
006	Trade and transport	-13.78	-5.43	-0.28	-0.38	-2.95	-8.05	-4.30
007	Services	-6.37	-13.99	-5.33	-0.03	-0.70	-9.37	22.86
	Total	0.00	-32.96	-6.73	5.77	-14.41	-21.12	21.85

Source: Author's calculation

Table 13. Comparison of the DPG Analysis and the Real Changes in Thailand (2000–2005)

Code	Description	In constant prices (1,000 US Dollars)	
		DPG	Real Change
001	Agriculture, livestock, forestry, and fisheries	1,318,104	5,136,498
002	Mining and quarrying	850,803	1,800,068
003	Manufacturing	-270,758	35,922,377
004	Electricity, gas and water supply	1,891,353	4,405,324
005	Construction	-377,798	2,225,466
006	Trade and transport	-2,333,163	10,586,555
007	Services	-1,078,543	13,660,174

Source: Author's calculation

Appendix 1. Sector Classification of the Asian International Input-Output Table 1995, 2000, and 2005

7 Sectors		26 Sectors	
Code	**Description**	**Code**	**Description**
001	Agriculture, livestock, forestry, and fisheries	001	Paddy
		002	Other agricultural products
		003	Livestock and poultry
		004	Forestry
		005	Fisheries
002	Mining and quarrying	006	Crude petroleum and natural gas
		007	Other mining
003	Manufacturing	008	Food, beverages, and tobacco
		009	Textiles, leather, and the products thereof
		010	Wooden furniture and other wooden products
		011	Pulp, paper, and printing
		012	Chemical products
		013	Petroleum and petrol products
		014	Rubber products
		015	Non-metallic mineral products
		016	Metals and metal products
		017	Industrial machinery
		018	Computers and electronic equipment
		019	Other electrical equipment
		020	Transport equipment
		021	Other manufacturing products
004	Electricity, gas and water supply	022	Electricity, gas and water supply
005	Construction	023	Construction
006	Trade and transport	024	Trade and transport
007	Services	025	Other services
		026	Public administration

Source: Asian International I-O Table Technical Notes, IDE-Jetro.